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Atty. Dkt. No. AMAT/3049.X1/CPI/DT/PJS

REMARKS

This is intended as a full and complete response to the Office Action dated January 31, 2005, having a shortened statutory period for response set to expire on May 2, 2005. Claims 8-23, 31-39 and 41-50 remain pending in the application and are shown above. Claims 8, 9, 11-14, 16-23, 31, 32, 35 and 41-50 are rejected, claims 10, 15, 33 and 34 are objected to, and claims 36-39 are indicated to be allowable by the Examiner. Applicants have canceled claims 18, 21, and 41-46 without prejudice for reasons discussed below. Please reconsider the claims pending in the application for reasons discussed below.

Claims 18 and 21 stand rejected under 35 U.S.C. § 112, second paragraph. Applicants have cancelled claims 18 and 21 obviating the rejection. Withdrawal of the rejection is respectfully requested.

Claim 8 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over *Konecni et al.* (EP 0849 779 A2) in view of *Van Cleemput et al.* (U.S. 5,872,058). Claims 8, 11-13, 22 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Tran et al.* (U.S. 5,534,445) in view of *Van Cleemput et al.* (U.S. 5,872,058). Claims 14, 16-21, 23 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Tran et al.* (U.S. 5,534,445) in view of *Van Cleemput et al.* (U.S. 5,872,058). Claims 31-32, 35 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Konecni et al.* (EP 0849 779 A2) in view of *Van Cleemput et al.* (U.S. 5,872,058). Claims 47-50 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Tran et al.* (U.S. 5,534,445) in view of *Van Cleemput et al.* (U.S. 5,872,058).

In each of these rejections, the Examiner asserts that both *Konecni et al.* and *Tran et al.* disclose a gas mixture of hydrogen, helium and argon, but fail to disclose "the step of increasing the helium content of the plasma to increase etching of the patterned substrate and wherein the gas mixture comprises less than about 75% by volume of argon." The Examiner asserts that *Van Cleemput et al.* "in a process for filling gaps on substrate, discloses step of increasing the inert gas (helium) of the plasma to increase etching of the patterned substrate surface and wherein the gas

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mixture comprises about 13% by volume of argon (col 2, lines 10-12, col 3, lines 35-38)." The Examiner then asserts that it would be obvious "to modify either *Konecni et al.* or *Tran et al.* by increasing the inert gas (helium) of the plasma and using the gas mixture comprises less than about 13% by volume of argon as per *Van Cleemput* because *Van Cleemput* teaches that etch rates are typically increased by increasing the flow rate of the inert gas (helium) (col 2, lines 9-10) and as the concentration of Ar decreases about 13% (fig. 8), the etch/dep ratio decreases, which corresponds to the overall deposition rate increasing (col. 4, lines 49-52)." Furthermore, the Examiner in the "Response to Arguments" states that *Van Cleemput* "teaches the advantages of increasing the helium and decreasing the argon in an etching gas mixture."

Applicants respectfully traverse these rejections. *Van Cleemput* discloses a silane, oxygen and argon gas to gapfill using HDP processes. *Van Cleemput* also discloses that "other inert or etchant gases, such as He or H₂, may be substitute for Ar." (col. 3, lines 35-36.) *Van Cleemput* further discloses that "[e]tch rates are typically increased by increasing the flow rate of the inert gas." (col 2, lines 10-12.) Accordingly, *Van Cleemput* does not teach a gas mixture having both argon and helium as required in the base claims, and does not motivate or suggest increasing the helium content of a hydrogen, helium and argon gas mixture. If anything, *Van Cleemput* may suggest increasing both the helium and argon contents since both can be considered "inert gases."

Moreover, *Van Cleemput* does not teach "increasing the helium content of the plasma to increase etching of the patterned substrate surface, wherein the gas mixture comprises less than about 75% by volume of argon," as recited in the base claims. As mentioned above, *Van Cleemput* teaches "that as the concentration of Ar decreases, the etch/dep ratio decreases, which corresponds to the overall deposition rate increasing. (col. 4, lines 49-52.)" Accordingly, *Van Cleemput* teaches decreasing the argon content to increase deposition, which means the etch rate necessarily decreases. *Van Cleemput*, therefore, teaches away from the claimed invention and does not motivate or suggest "increasing the helium content of the plasma generated from a gas mixture consisting of argon, helium and hydrogen to increase etching of the patterned

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substrate surface, wherein the gas mixture comprises less than about 75% by volume of argon," as recited in the base claims.

For at least these reasons, *Van Cleemput* does not teach, show, or suggest increasing the helium content of a plasma generated from a gas mixture consisting of helium, argon, and hydrogen as recited in the base claims and as the Examiner stated, "both *Konecni et al.* and *Tran et al.* ... fail to disclose "the step of increasing the helium content of the plasma to increase etching of the patterned substrate and wherein the gas mixture comprises less than about 75% by volume of argon." Therefore, a combination of the references (*Tran et al./Van Cleemput* or *Konecni et al./Van Cleemput*) does not teach or suggest the claimed invention. Withdrawal of the rejections and allowance of the claims is respectfully requested.

Claims 41-46 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over *Tran et al.* (U.S. 5,534,445) in view of *Van Cleemput et al.* (U.S. 5,872,058). Applicants have cancelled claims 41-46 without prejudice. The cancellation of those claims is not an admission of non-patentability. Applicants have simply cancelled those claims to expedite prosecution, preserving the right to pursue those claims in a separate continuation or divisional application. Accordingly, withdrawal of the rejection is respectfully requested.

Claims 10, 15, 33, 34 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Applicants wish to defer presenting these claims in dependent form until the Examiner has considered the Applicants' arguments herein. Applicants believe their arguments will convince the Examiner that the base claims are in condition for allowance. As such, the objected claims 10, 15, 33, 34 will be in condition for allowance in their current, dependent form.

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In conclusion, the references cited by the Examiner, alone or in combination, do not teach, show, or suggest the invention as claimed. Having addressed all issues set out in the office action, Applicant respectfully submits that the claims are in condition for allowance and respectfully request that the claims be allowed.

Respectfully submitted,



Robb D. Edmonds

Registration No. 46,681

MOSER, PATTERSON & SHERIDAN, L.L.P.

3040 Post Oak Blvd. Suite 1500

Houston, TX 77056

Telephone: (713) 623-4844

Facsimile: (713) 623-4846

Attorney for Applicant(s)